

This review is not cumulative. Make sure to review your notes, homework assignments, and old tests as well!

1. Which of the following angles is coterminal with an angle of 130° , assuming both angles are drawn in the standard position?

(1) 230°

(3) 430°

(2) -230°

(4) -310°

$$130^\circ - 360^\circ = -230^\circ$$

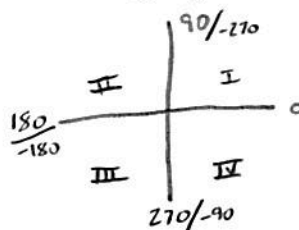
2. If drawn in the standard position, which of the following angles terminates in the third quadrant?

(1) 120°

(3) -210°

(2) -60°

(4) 240°



3. A rotation angle, drawn in standard position, measures 1200° . In which quadrant does its terminal ray lie?

(1) I

(3) III

(2) II

(4) IV

$$\begin{array}{r} 1200 \\ - 360 \\ \hline 840 \\ - 360 \\ \hline 480 \\ - 360 \\ \hline 120 \end{array}$$

120° QII

4. Which of the following has the same reference angle as 150° ?

(1) 210°

(3) 120°

(2) 300°

(4) 70°

$$180 - 150 = 30^\circ \text{ RA}$$

$$210 - 180 = 30^\circ \text{ AA} \checkmark$$

5. The radian angle $\frac{3\pi}{4}$ is equivalent to

(1) 67.5°

(3) 270°

(2) 135°

(4) 325°

$$\frac{3(180)}{4} = 135^\circ$$

6. The angle 240° can be written equivalently as which of the following in the radian system?

(1) $\frac{7\pi}{6}$

(3) $\frac{3\pi}{2}$

$$\overset{4}{240} \cdot \frac{\pi}{180} = \frac{4\pi}{3}$$

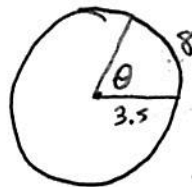
(2) $\frac{5\pi}{4}$

(4) $\frac{4\pi}{3}$

7. If the minute hand of a clock is 3.5 inches long and its tip rotates through a distance of 8 inches, then which of the following is closest to the angle that it rotates?

(1) 131°

(3) 267°



$$\theta = \frac{8}{3.5} = 2.2857$$

Convert to degrees

$$2.2857 \cdot \frac{180}{\pi} = 130.96$$

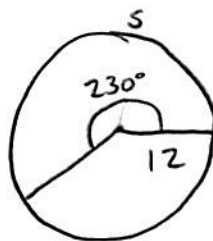
(2) 174°

(4) 314°

8. A goat is attached to a 12 foot long leash pulled tight and rotates through an angle of 230° . Which of the following is closest to the distance that the goat travels?

(1) 23 ft

(3) 41 ft



$$s = r\theta$$

* needs to be in radians

$$s = 12 \left(\frac{230\pi}{180} \right) \quad 230 \cdot \frac{\pi}{180}$$

$$s = 48.17$$

(2) 32 ft

(4) 48 ft

9. A point lies on the unit circle whose x-coordinate is $\frac{1}{4}$. If the point lies in the fourth quadrant, then which of the following is its y-coordinate?

$$x^2 + y^2 = 1$$

y is negative

(1) $\frac{3}{4}$

(3) $-\frac{\sqrt{7}}{4}$

$$\left(\frac{1}{4} \right)^2 + y^2 = 1$$

$$\frac{1}{16} + y^2 = 1$$

$$y^2 = \frac{15}{16}$$

$$y = -\frac{\sqrt{15}}{\sqrt{16}} = -\frac{\sqrt{15}}{4}$$

(2) $-\frac{\sqrt{15}}{4}$

(4) $\frac{\sqrt{11}}{2}$

10. The terminal ray of an angle drawn in standard position on the unit circle that measures 30° has coordinates of $\left(\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$. Based on this information, what is the value of $\cos(150^\circ)$?

(1) $\frac{1}{2}$

(3) $\frac{\sqrt{3}}{2}$

(2) $-\frac{1}{2}$

(4) $-\frac{\sqrt{3}}{2}$

Q II so cos is negative

cos = x coordinate

$$\cos(150) = -\frac{\sqrt{3}}{2}$$

11. For an angle A that terminates in the second quadrant, $\sin A = \frac{2}{3}$. Which of the following calculations would result in the value of $\cos A$?

cos is negative

$$\sin^2 + \cos^2 = 1$$

(1) $\sqrt{1 + \left(\frac{2}{3}\right)^2}$

(3) $-\sqrt{1 - \left(\frac{2}{3}\right)^2}$

(2) $-\sqrt{1 + \left(\frac{2}{3}\right)^2}$

(4) $\sqrt{1 - \left(\frac{2}{3}\right)^2}$

$$\left(\frac{2}{3}\right)^2 + \cos^2 = 1$$

$$\cos^2 = 1 - \left(\frac{2}{3}\right)^2$$

$$\cos = \pm \sqrt{1 - \left(\frac{2}{3}\right)^2}$$

$$\cos A = -\sqrt{1 - \left(\frac{2}{3}\right)^2}$$

12. Which of the following could not be the value of the cosine of an angle?

(1) $-\frac{4}{5}$

(3) $\frac{\sqrt{11}}{4}$

(2) $\frac{7}{3}$

(4) $-\frac{\sqrt{3}}{2}$

cos is between -1 and 1

13. If an angle has a positive cosine but a negative sine then it must terminate in which of the following quadrants?

I or IV

III or IV

(1) I

(3) III

(2) II

(4) IV

Sin		A
Tan		Cos

14. For a sequence defined by $f(1) = 13$ and $f(n) = 2f(n-1) + (n-2)$, which of the following is the value of $f(4)$?

(1) 53

(2) 76

(3) 108

(4) 126

$$f(2) = 2(13) + (2-2) = 26$$

$$f(3) = 2(26) + (3-2) = 53$$

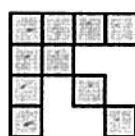
$$f(4) = 2(53) + (4-2) = 108$$

15. In the visual pattern below, the number of squares in each pattern forms a sequence. Which of the following four sequence definitions properly model the number of squares, s_n ?



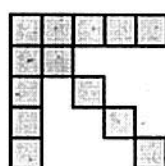
$n = 1$

7



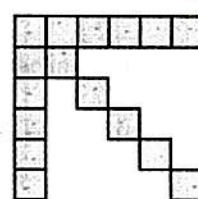
$n = 2$

10



$n = 3$

13



$n = 4$

16

~~I. $s_n = 3n + 7$~~

II. $s_n = 3n + 4$ ✓

III. $s_1 = 7$ and $s_n = s_{n-1} + 3$ ✓

IV. $s_1 = 7$ and $s_n = s_{n-1} + n$ ✗

(1) I and III

(3) II and IV

(2) II and III

(4) I and IV

16. Which of the following formulas properly describes the sequence $3, \frac{3}{2}, \frac{3}{4}, \frac{3}{8}, \dots$?

(1) $a_n = 3 + 2^n$

(3) $a_n = \frac{3}{2^n}$

(2) $a_n = 3(2)^n$

(4) $a_n = \frac{3}{2^{n-1}}$

17. If a sequence is defined by $c_1 = 15$ and $c_n = c_{n-1} + 4$ then what is the value of the 20th term of this sequence?

(1) 80

(3) 95

(2) 91

(4) 101

Arithmetic with common difference of 4

$$a_n = a_1 + 4(n-1)$$

$$a_{20} = 15 + 4(20-1)$$

$$a_{20} = 91$$

18. A concert hall is constructed so that each row has 5 more seats than the row in front of it. If the first row contains 15 seats, how many seats does the 30th row contain?

Arithmetic $d=5$

(1) 155

(3) 165

(2) 160

(4) 170

$$a_{30} = 15 + 5(30-1)$$

19. If the first three terms of a geometric sequence are 8, 12, and $2x-4$, then what is the value of x ?

(1) 5

(3) 8

(2) 7

(4) 11

$$\frac{12}{8} = 1.5 = r$$

$$12(1.5) = 2x - 4$$

$$18 = 2x - 4$$

$$22 = 2x$$

$$11 = x$$

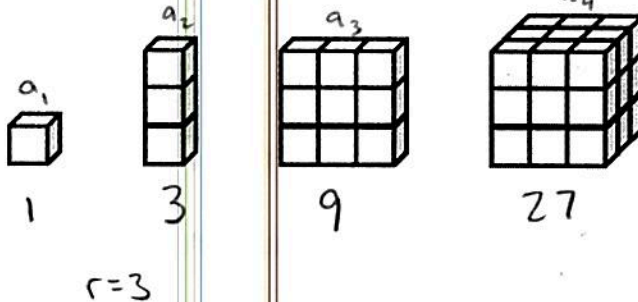
20. The number of cubes in each pattern below forms a geometric sequence. How many cubes would be in the 10th pattern?

(1) 6,561

(2) 19,683

(3) 59,049

(4) 177,147



$$a_{10} = 1(3)^{10-1}$$

$$a_{10} = 3^9$$

$$a_{10} = 19683$$

21. Which of the following is the value of $\sum_{i=2}^5 (i^2 - 3)$?

(1) 42

(3) 51

(2) 49

(4) 56

$$\begin{aligned} & (2^2 - 3) + (3^2 - 3) + (4^2 - 3) + (5^2 - 3) \\ & (4 - 3) + (9 - 3) + (16 - 3) + (25 - 3) \\ & 1 + 6 + 13 + 22 \end{aligned}$$

$$42$$

Arithmetic with $d = 2$

$$a_{100} = 2 + 2(99)$$

$$a_{100} = 200$$

22. The sum of the first 100 positive, even integers is $a_1 = 2$

(1) 5,100

(3) 7,500

$$Sum = \frac{n}{2} (a_1 + a_n)$$

(2) 10,100

(4) 14,200

$$Sum = \frac{100}{2} (2 + 200)$$

$$= 50(202) = 10100$$

23. What is the value of an arithmetic series whose first term is -100 , whose common difference is 8 , and which has 30 terms?

(1) -150

(3) 320

$$n = 30$$

$$a_{30} = -100 + 8(30-1)$$

(2) -10

(4) 480

$$a_1 = -100$$

$$a_{30} = 132$$

need a_{30}

$$Sum = \frac{30}{2} (-100 + 132)$$

$$Sum = 480$$

24. If the following sum represents a geometric series, then which of the following is its value?

(1) 125,640

(3) 155,600

Sum

$$r = 3$$

$$5 + 15 + 45 + \dots + 98,415$$

(2) 147,620

(4) 162,350

need n :

$$98415 = 5(3)^{n-1}$$

$$19683 = 3^{n-1}$$

$$3 = 3^{n-1}$$

$$9 = 3^{n-1}$$

$$10 = n$$

$$Sum = \frac{5(1-3^{10})}{1-3}$$

$$Sum = 147620$$

25. A sequence is given by the recursive definition:

$$a_1 = 7 \text{ and } a_n = a_{n-1}(2)^n$$

State the fourth term of this sequence. Show how you arrived at your answer.

$$a_1 = 7$$

$$a_2 = 7(2)^2 = 28$$

$$a_3 = 28(2)^3 = 224$$

$$a_4 = 224(2)^4 = 3584$$

3584



26. A line segment is broken into five sections that form a geometric sequence. The smallest section is 16 inches and the largest section is 81 inches.

(a) What is the common ratio between the five sections? Show how you arrived at your answer.

$$81 = 16(r)^4$$

$$\frac{81}{16} = r^4 \quad r = \frac{3}{2}$$

$$\boxed{\frac{3}{2}}$$

must be positive because it is a length

(b) What is its overall length of the line segment? Explain your approach.

$$\frac{16}{\quad} \quad \frac{24}{\quad} \quad \frac{36}{\quad} \quad \frac{54}{\quad} \quad \frac{81}{\quad}$$

or Add them all

$$\text{Sum} = \frac{16(1 - \frac{3}{2}^5)}{1 - \frac{3}{2}}$$

$$\text{Sum} = \boxed{211}$$

27. Rosie is filling a hot tub with water in such a way that she originally adds 50 gallons, then 40 gallons, then 32 gallons, etcetera, with each amount being 80% of the previous amount added. How many times must she fill the hot tub before the total amount of water is greater than 200 gallons? Only an algebraic approach will be accepted.

$$\frac{50}{\quad} \quad \frac{40}{\quad} \quad \frac{32}{\quad}$$

$$r = .8$$

$$n = 8$$

$\boxed{8 \text{ times}}$

$$\text{Sum} = 200$$

$$200 = \frac{50(1 - .8^n)}{1 - .8}$$

$$200 = \frac{50(1 - .8^n)}{.2}$$

$$200 = 250(1 - .8^n)$$

$$\frac{200}{250} = 1 - .8^n$$

$$\frac{200}{250} - 1 = -.8^n$$

$$-.2 = -.8^n$$

use logs

$$\log_{.8}(.2) = n$$

$$n = 7.21$$

round up because it needs to be more than 200

28. An angle drawn in standard position measures 10 radians. In what quadrant does its terminal ray lie? Show the reasoning that leads to your answer.

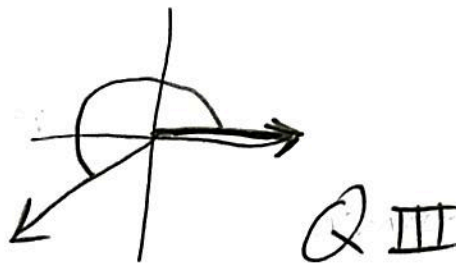
convert to degrees

$$10 \cdot \frac{180}{\pi}$$

$$\frac{1800^\circ}{\pi} \approx 573^\circ$$

coterminal

$$573 - 360 = 213^\circ$$



29. In the circle shown below, $AB = 30$ and the length of the minor arc from point A to point C is 40. Find the exact measure of the marked angle β in terms of radii. Show how you arrived at your answer.

$$AB = 30 \Rightarrow AO = 15$$

$$\theta = \frac{s}{r}$$

$$\theta = \frac{40}{15} = \frac{8}{3} \text{ radians}$$

